EOS Production Sites
Network Performance Report: July 2014

This is a monthly summary of EOS network performance testing between production sites – comparing the measured performance against the requirements. Significant improvements are noted in Green, Network problems in Red, System problems and Requirements issues in Gold, Issues in Orange, and other comments in Blue.

Highlights:

- **Very stable flows**
  - o   **GPA: 3.94 ↑ New All-time High!** (was 3.88 last month)
    - ▪ No MODIS reprocessing flow this month (to EROS and NSIDC).
      - • Nominally starts in August!

- **Requirements**: using the Network Requirements Database for 2014
  - o Including GPM, OCO2, and SMAP (starting in FY '15) missions
  - o Removed AMSR-E flows

- **All flows rated Good or Excellent !!!**
  - o **Only 1 Good flow --** limited by test nodes

## Ratings Changes:

Upgrade: ↑: LaRC → JPL: Good → Excellent

Downgrades: ↓: None

Ratings Categories:

Rating	Value	Criteria
Excellent:	**4**	**Total Kbps** > Requirement * 3
Good:	**3**	1.3 * Requirement <= **Total Kbps** < Requirement * 3
Adequate:	**2**	Requirement < **Total Kbps** < Requirement * 1.3
Almost Adequate:	**1.5**	Requirement / 1.5 < **Total Kbps** < Requirement
Low:	**1**	Requirement / 3 < **Total Kbps** < Requirement / 1.5
Bad:	**0**	**Total Kbps** < Requirement / 3

Where Total Kbps = Average Integrated Kbps (where available), otherwise just iperf

Note that " **Almost Adequate** " implies meeting the requirement excluding the usual 50% contingency factor.

Ratings History:

EOS Production Sites
Ratings History: September 1999 through July 2014
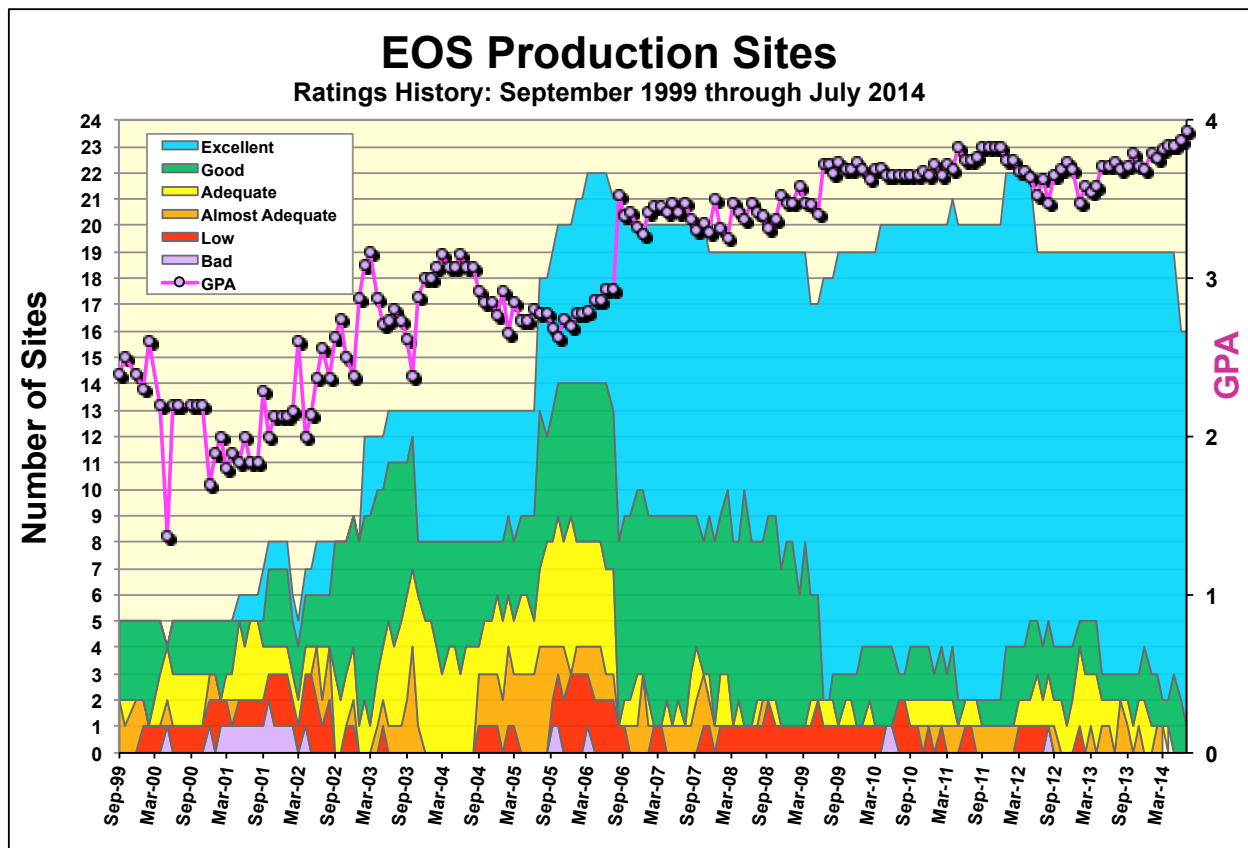
The chart above shows the number of sites in each rating category since EOS Production Site testing started in September 1999. Note that these ratings do NOT relate to absolute performance – they are relative to the EOS requirements.

Additions and deletions:

    2011 April: Added RSS to GHRC
    2011 May: Deleted WSC to ASF for ALOS
    2012 January: Added NOAA → GSFC-SD3E
                     Added GSFC-SD3E → Wisconsin
    2012 June: Deleted GSFC → LASP
                     Deleted GSFC ← → JAXA
    2014 June: AMSR-E no longer producing data
                     Deleted JPL to RSS and RSS to GHRC
                     Deleted JPL to NSIDC
                          JPL to NSIDC requirements resume in FY '15 for SMAP

Requirements Basis:

In June 2014, the requirements were updated to the latest values in the database!

- Added missions GPM, OCO2, and SMAP (effective FY '15) missions
- Removed AMSR-E, ICESAT flows
- MODIS reprocessing incorporated month-by-month
  - No reprocessing until 2014 August

In June 2012, the requirements were switched, to use the EOSDIS network requirements database.

Previously, the requirements were based on the EOS Networks Requirements Handbook, Version 1.4.3 (from which the original database requirements were derived). Prior to that, the requirements were derived from version 1.4.2.

One main difference between Handbooks 1.4.2 and 1.4.3 is that in 1.4.3 most flows which occur less than once per day were averaged over their production period. These flows were typically monthly Level 3 data transfers, which were specified to be sent in just a few hours. However, they could easily be accommodated either between the per-orbit flows, or within the built-in contingency. Previously, these flows were added in linearly to the requirements, making the requirements unrealistically high.

Additionally, the contingency for reprocessing flows greater than 2X reprocessing was reduced. These flows WERE a major component of the contingency, so adding additional contingency on top of these flows was considered excessive.

Integrated Charts:

Integrated charts are included with site details, where available. These charts are "Area" charts, with a "salmon" background. A sample Integrated chart is shown here. The yellow area at the bottom represents the daily average of the user flow from the source facility (e.g., GSFC, in this example) to the destination facility (JPL, in this example) obtained from routers via "netflow".
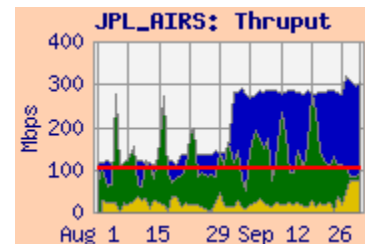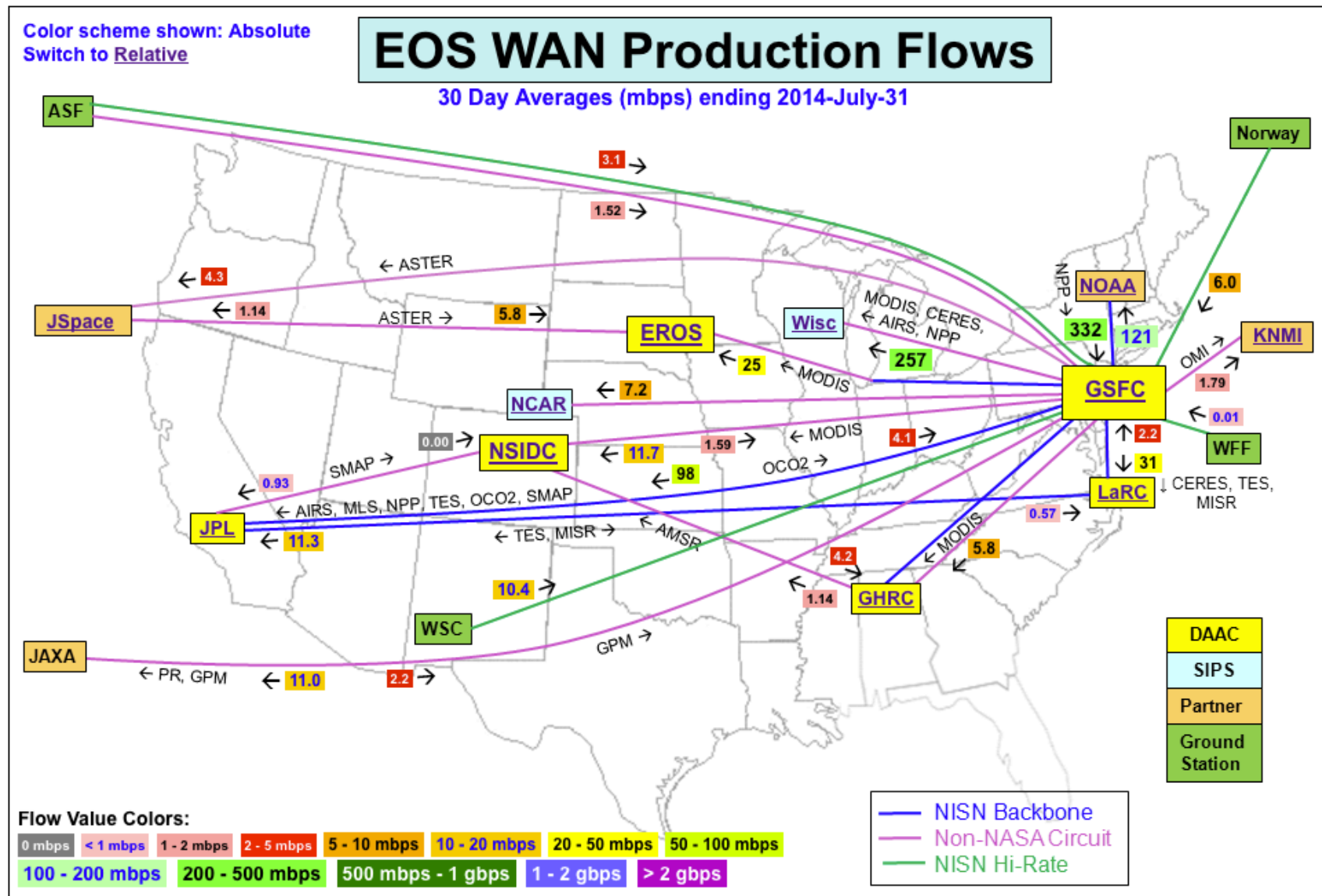

The green area is stacked on top of the user flow, and represents the "adjusted" daily average iperf thruput between the source-destination pair most closely corresponding to the requirement. This iperf measurement essentially shows the circuit capacity remaining with the user flows active. Adjustments are made to compensate for various systematic effects, and are best considered as an approximation.

The red line is the requirement for the flow from the source to destination facilities. On some charts a blue area is also present – usually "behind" the green area – representing adjusted iperf measurements from a second source node at the same facility.
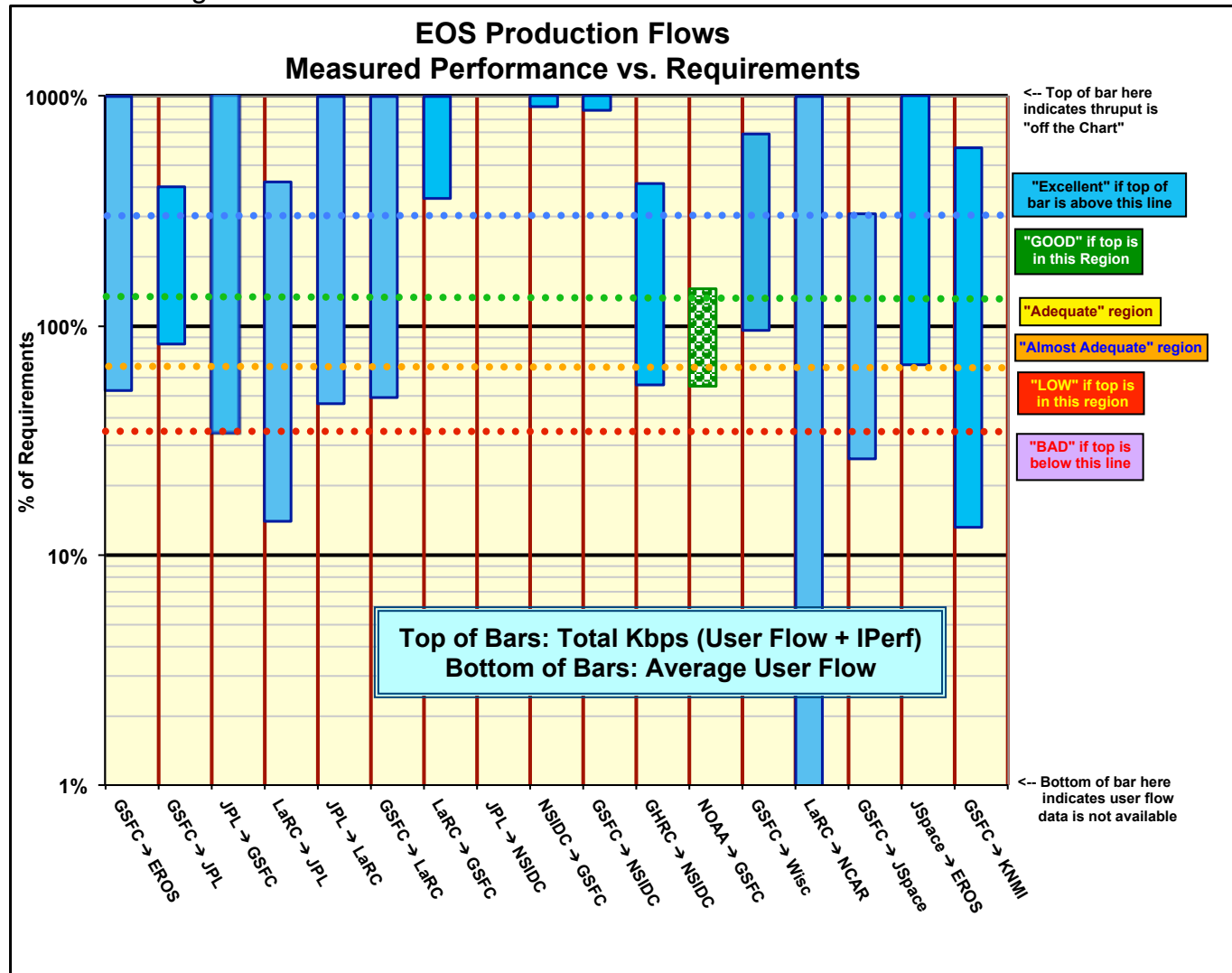
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Network Requirements vs. Measured Performance

July 2014		Requirements (mbps)		Testing				Ratings	
Source ➜ Destination	**Instrument (s)**	**Current**	**Old**	**Source ➜ Dest Nodes**	**Average User Flow mbps**	**iperf Median mbps**	**Integrated mbps**	**Ratings re FY '14 Requirements**	
		FY '14	**FY '12**					**This Month**	**Last Month**
GSFC ➜ EROS	MODIS, LandSat	49.8	548.4	MODAPS-PDR ➜ EROS LPDAAC	26.1	777.0	780.3	Excellent	Good
GSFC ➜ JPL	AIRS, MLS, NPP, TES, OCO2, SMAP	114.8	63.0	NPP SD3E OPS1 ➜ JPL-AIRS	95.8	436.7	463.9	Excellent	Ex
JPL ➜ GSFC	MLS, OCO2	11.9	0.57	JPL-PODAAC ➜ GSFC GES DISC	4.1	604.1	605.2	Excellent	Ex
LaRC ➜ JPL	TES, MISR	83.5	83.5	LARC-ASDC ➜ JPL-TES	11.8	354.4		Excellent	Good
JPL ➜ LaRC	TES	1.1	1.1	JPL-TES ➜ LARC-PTH	0.50	168.9		Excellent	Ex
GSFC ➜ LaRC	CERES, MISR, MOPITT, TES, MODIS	60.7	52.2	GSFC EDOS ➜ LaRC ASDC	29.6	840.1	849.9	Excellent	Ex
LaRC ➜ GSFC	MISR	0.6	0.6	LARC-ASDC ➜ GES DISC	2.17	934.8	934.8	Excellent	Ex
JPL ➜ NSIDC	AMSR-E, SMAP	0	0.16	JPL-PODAAC ➜ NSIDC		753.9		n/a	n/a
NSIDC ➜ GSFC	AMSR-E, MODIS, ICESAT	0.009	0.017	NSIDC DAAC ➜ GES DISC	1.57	775.1	775.2	Excellent	Ex
GSFC ➜ NSIDC	AMSR-E, MODIS, ICESAT	1.1	8.4	MODAPS PDR ➜ NSIDC-DAAC	9.5	580.6	581.0	Excellent	Ex
GHRC ➜ NSIDC	AMSR-E	2.08	0.5	GHRC ➜ NSIDC DAAC	1.15	8.5	8.6	Excellent	Ex
NOAA ➜ GSFC	NPP	601.3	522.3	NOAA-PTH ➜ GSFC NPP-SD3E OPS1	328.8	803.5	873.5	Good	Good
GSFC ➜ Wisc	NPP, MODIS, CERES, AIRS	264.2	259.1	GSFC NPP-SD3E OPS1 ➜ WISC	252.9	1777.4	1813.6	Excellent	Ex
LaRC ➜ NCAR	MOPITT	0.044	0.044	LaRC-PTH ➜ NCAR		145.1		Excellent	Ex
GSFC ➜ JAXA	TRMM, AMSR-E, MODIS, GPM	15.4	3.5	GSFC-EBnet ➜ JAXA	10.6	n/a		n/a	n/a
JAXA ➜ GSFC	AMSR-E, GPM	3.3	0.16	JAXA ➜ GSFC-EBnet	2.11	n/a		n/a	n/a
GSFC ➜ JSpace	ASTER	16.4	6.8	GSFC-EDOS ➜ JSpace-ERSD	4.32	48.1	50.5	Excellent	Ex
JSpace ➜ EROS	ASTER	8.3	8.3	JSpace-ERSD ➜ EROS PTH	5.63	298.5	298.5	Excellent	Ex
GSFC ➜ KNMI	OMI	13.4	13.4	GSFC-OMISIPS ➜ KNMI ODPS	1.77	79.4	79.8	Excellent	Ex

		Significant change from FY '12 to FY '14				**Ratings Summary**			
			Value used for ratings					**FY '14 Req**	
								Score	**Prev**
*Criteria:	**Excellent**	**Total Kbps** > Requirement * 3					**Excellent**	15	14
	Good	1.3 * Requirement <= **Total Kbps** < Requirement * 3					**Good**	1	2
	Adequate	Requirement < **Total Kbps** < Requirement * 1.3					**Adequate**	0	0
	Almost Adequate	Requirement / 1.5 < **Total Kbps** < Requirement					**Almost Adequate**	0	0
	Low	Requirement / 3 < **Total Kbps** < Requirement / 1.5					**Low**	0	0
	Bad	**Total Kbps** < Requirement / 3					**Bad**	0	0
							Total Sites	16	16
Notes:	Flow Requirements include:								
	TRMM, Terra, Aqua, Aura, ICESAT, QuikScat, GEOS, NPP, GPM, SMAP, OCO2						**GPA**	3.94	3.88

EOS WAN Production Flows

30 Day Averages (mbps) ending 2014-July-31

Color scheme shown: Absolute
Switch to Relative

Flow Value Colors:
0 mbps | <1 mbps | 1 - 2 mbps | 2 - 5 mbps | 5 - 10 mbps | 10 - 20 mbps | 20 - 50 mbps | 50 - 100 mbps
100 - 200 mbps | 200 - 500 mbps | 500 mbps - 1 gbps | 1 - 2 gbps | > 2 gbps

— NISN Backbone
— Non-NASA Circuit
— NISN Hi-Rate

DAAC
SIPS
Partner
Ground Station

This chart shows the averages for the main EOS production flows for the current month. **The flows from the ground stations were added this month, as well as JPL ←→ NSIDC.** Up to date flow information can be found at
http://ensight.eos.nasa.gov/Weather/web/hourly/Production_Flows-A.shtml

This graph shows a bar for each source-destination pair – relating the measurements to the requirements for that pair. The bottom of each bar represents the average measured user flow from the source site to the destination site (as a percent of the requirement) – it indicates the relationship between the requirements and actual flows. Note that the requirements generally include a 50% contingency factor above what was specified by the projects, so a value of 67% (dotted orange line) would indicate that the project is flowing as much data as requested. The top of each bar similarly represents the integrated measurement, combining the user flow with Iperf measurements – this value (when available) is used to determine the ratings.

EOS Production Flows
Measured Performance vs. Requirements

<-- Top of bar here indicates thruput is "off the Chart"

"Excellent" if top of bar is above this line

"GOOD" if top is in this Region

"Adequate" region

"Almost Adequate" region

"LOW" if top is in this region

"BAD" if top is below this line

Top of Bars: Total Kbps (User Flow + IPerf)
Bottom of Bars: Average User Flow

<-- Bottom of bar here indicates user flow data is not available

% of Requirements

GSFC → EROS
GSFC → JPL
JPL → GSFC
LaRC → JPL
JPL → LaRC
GSFC → LaRC
LaRC → GSFC
JPL → NSIDC
NSIDC → GSFC
GSFC → NSIDC
GHRC → NSIDC
NOAA → NSIDC
GSFC → GSFC
LaRC → Wisc
GSFC → NCAR
JSpace → JSpace
GSFC → EROS
GSFC → KNMI

1) EROS:

Ratings: GSFC → EROS: Continued **Excellent**
ERSDAC→ EROS: Continued **Excellent**

Web Pages: http://ensight.eos.nasa.gov/Organizations/production/EROS.shtml
http://ensight.eos.nasa.gov/Organizations/production/EROS_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	**Median**	**Worst**		
MODAPS-PDR→ EROS LPDAAC	858.7	777.0	485.2	26.1	780.3
GSFC-EDOS → EROS LPDAAC	425.6	417.9	33.5		
GES DISC → EROS LPDAAC	648.0	615.7	435.0		
GSFC-ENPL → EROS LPDAAC	878.0	867.0	754.0		
JSpace-ERSD→ EROS LPDAAC	311.6	298.5	212.8	5.6	298.5
NSIDC SIDADS→ EROS PTH	919.7	916.8	895.9		
GSFC-ENPL → EROS PTH	2210.9	2164.2	1841.8		
GSFC-ENPL → EROS PTH (IPv6)	n/a	n/a	n/a		
GSFC-NISN → EROS PTH	836.0	637.5	358.0		
ESDIS-PS → EROS PTH	838.9	728.1	295.4		
LaRC PTH→ EROS PTH	161.7	150.0	99.8		

Requirements:

Source → Dest	Date	mbps	prev	Rating
GSFC → EROS	6/14	49.8	548.4	**Excellent**
ERSDAC → EROS	FY '06 –	8.3	8.3	**Excellent**

Comments: **1.1 GSFC → EROS :** The rating is based on the **MODAPS-PDR** Server to EROS LP DAAC measurement, since that is the primary flow. **There is no reprocessing flow requirement this month, so the requirement is only 49.8 mbps (apparently will increase to 1016.1 mbps in August).** The average user flow this month was stable, and about 56% of the requirement without reprocessing or contingency.

Thruput from all sources was mostly stable this month. The median integrated thruput from **MODAPS-PDR** to LPDAAC was more than 3 x the non-reprocessing requirement, so the rating remains **Excellent** .

The median thruput from **GSFC-EDOS** and **GES DISC** (also on EBnet) was also stable, but with typical low daily minimums. The route from EBnet sources is via the Doors, to the NISN 10 gbps backbone, to the NISN Chicago CIEF, then via a NISN GigE, peering at the StarLight Gigapop with the EROS OC-48 (2.5 gbps) tail circuit.

Iperf testing for comparison is performed from **GSFC-ENPL** to both LPDAAC (the "FTL" node, outside the EROS firewall) and to EROS-PTH (both 10 gig hosts). The route from **GSFC-ENPL** to EROS is from GSFC via a direct 10 gig connection to the MAX, to Internet2, to StarLight in Chicago, then via the EROS OC-48 tail circuit. **GSFC-ENPL** (IPv4) to EROS-PTH now typically gets over 2 gbps. This shows that the capacity of this network is well in excess of the requirement – it would also be rated **Excellent** . **GSFC-ENPL IPv6** tests have been failing since February.

1.2 JSpace-ERSD → EROS: **Excellent** . See section 9 (ERSD) for further discussion.

1.3 NSIDC → EROS-PTH: Performance was also stable and excellent this month.

1.4 LaRC → EROS-PTH: Testing from **LaRC-PTH** to EROS-PTH was restored in June (had been failing since April). The route is via NISN SIP to the Chicago CIEF to StarLight – similar to EBnet sources. Performance is consistent with the **LaRC-PTH** 200 mbps outflow limitation.
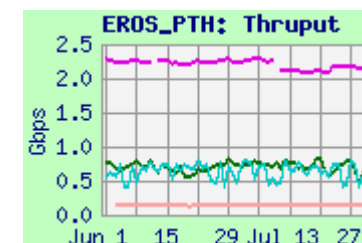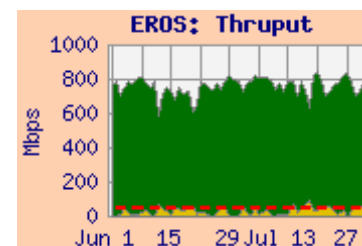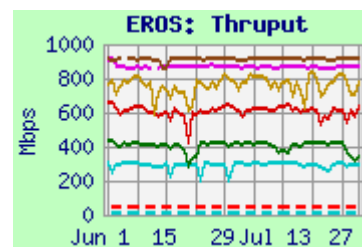
2) to GSFC
2.1) to NPP, GES DISC, etc.

Ratings: NOAA → NPP SD3E: Continued **Good**
NSIDC → GES DISC: Continued **Excellent**
LDAAC → GES DISC: Continued **Excellent**
JPL → GSFC: Continued **Excellent**

Web Pages:

http://ensight.eos.nasa.gov/Missions/NPP/GSFC_SD3E.shtml
http://ensight.eos.nasa.gov/Organizations/production/GDAAC.shtml
http://ensight.eos.nasa.gov/Organizations/production/ESDIS_PTH.shtml
http://ensight.eos.nasa.gov/Missions/icesat/GSFC_ISIPS.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
NOAA-PTH → NPP-SD3E-OPS1	827.1	803.5	716.3	328.8	873.5
EROS LPDAAC → GES DISC	255.9	226.7	133.7		
EROS PTH → GSFC-ESDIS PTH	921.0	680.0	221.0		
JPL-PODAAC → GES DISC	845.9	604.1	220.9	4.13	
JPL-TES → GSFC-NISN	682.7	446.4	197.6		
LaRC ASDC → GES DISC	936.3	934.8	904.7	2.17	
LARC-ANGe → GSFC-ESDIS PTH	933.0	898.6	849.7		
NSIDC DAAC → GES DISC	846.1	775.1	570.8	1.57	
NSIDC DAAC → GSFC-ISIPS (scp)	31.5	30.9	26.2		

Requirements:

Source → Dest	Date	FY '14	FY '12	Rating
NSIDC → GSFC	FY '14 –	0.009	0.017	**Excellent**
LaRC ASDC → GES DISC	CY '12 –	0.6	0.6	**Excellent**
JPL → GSFC combined	FY '14 –	11.9	0.57	**Excellent**
NOAA → NPP SD3E	FY '14 –	601.3	522.3	**Good**

Comments:

2.1.1 NOAA → NPP-SD3E: Performance from **NOAA-PTH** to GSFC NPP-SD3E-OPS1 was very steady at over 800 mbps, limited by the Gig-E interface on the NOAA side test machine (the circuits are all 10 gbps). User flow was close to usual, and close to the requirement without contingency.

2.1.2 EROS LPDAAC, EROS-PTH → GSFC: The thruput for tests from **EROS LPDAAC** to GES DISC and from **EROS-PTH** to ESDIS-PTH were again noisy, with the PTH's getting better results than the DAACs.

2.1.3 JPL → GSFC: Thruput from **JPL-PODAAC** to GES DISC is noisy but long term stable. Note that JPL → EBnet flows take Internet2 instead of NISN, based on JPL routing policies. **The requirement was increased last month by adding OCO2 flows.** Thruput was well above 3 x the requirement, so the rating remains **Excellent**. The 4.1 mbps average user flow increased from 3.4 mbps last month, presumably due to OCO2 flows after its July 2 launch. It is now about 50% of the new requirement (without contingency).

Testing from **JPL-TES** to GSFC-NISN is routed via NISN PIP, and shows the capability of that network.

NPP-SD3E: Thruput

GES DISC: Thruput


ESDIS_PTH: Thruput

GSFC_NISN: Thruput
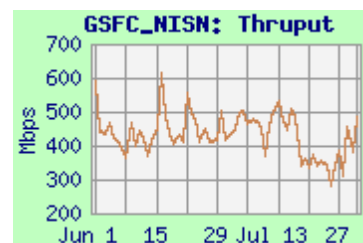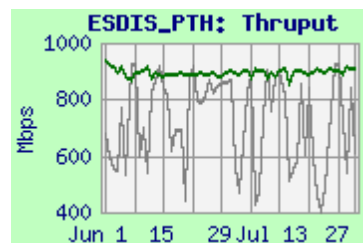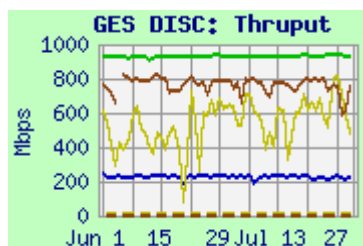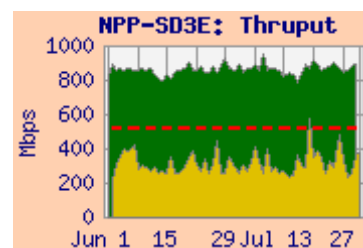
2.1) to NPP, GES DISC continued.

2.1.4 LaRC → GSFC: Performance from **LaRC ASDC** to GES DISC was very stable this month, as it has been since the host upgrade at ASDC in February '14. Thruput from **LaRC ANGe** to ESDIS-PTH was also stable. Both results remained way above 3 x the modest requirement, so the rating continues as **Excellent** . The user flow this month increased to over 3 x the requirement.

2.1.5 NSIDC → GSFC: Performance from **NSIDC** to GES DISC improved in October 2013, due to an upgraded host at NSIDC, dropped in January due to NSIDC routing issues, and recovered in February. It remained way above the tiny requirement, so the rating remains **Excellent.** The user flow was again well above both the old and lower new requirement. Thruput to **GSFC-ISIPS** using SCP remains well above the requirement.
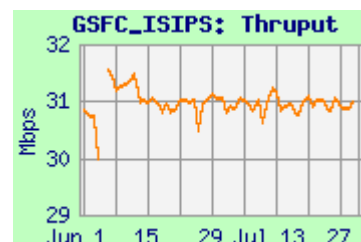
2.2 GSFC-ECHO: EOS Metadata Clearinghouse

Web Page: http://ensight.eos.nasa.gov/Organizations/gsfc/GSFC_ECHO.shtml

Test Results:

Source	Medians of daily tests (mbps)		
	Best	**Median**	**Worst**
EROS LPDAAC	195.3	185.0	119.4
EROS LPDAAC ftp	123.1	88.1	40.2
GES DISC	937.8	929.1	894.3
GES DISC ftp	930.2	891.4	531.6
LaRC ASDC DAAC	556.4	520.0	451.7
NSIDC DAAC	248.9	231.1	198.1
NSIDC DAAC ftp	108.1	81.1	38.8
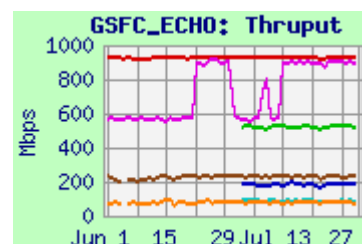
Comments: Performance was mostly stable from **GSFC** and **NSIDC**. FTP performance is mostly limited by TCP window size – especially from sites with long RTT. Testing from **EROS LPDAAC** and from **LaRC ASDC** resumed in July, after being blocked since December, due to host upgrades, requiring firewall rule changes.

2.3 GSFC-EMS: EOS Metrics System

Web Page: http://ensight.eos.nasa.gov/Organizations/gsfc/GSFC_EMS.shtml

Test Results:

Source	Medians of daily tests (mbps)		
	Best	**Median**	**Worst**
EROS LPDAAC	203.2	192.7	97.6
ESDIS-PTH	938.9	933.2	702.1
GES DISC	937.3	928.7	685.2
LARC ASDC	574.6	538.7	467.5
MODAPS-PDR	938.2	908.2	401.4
NSIDC-SIDADS	283.7	282.1	255.8
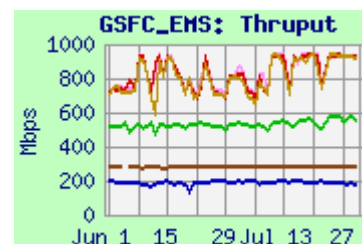
Comments: Testing is performed to GSFC-EMS from the above nodes, iperf only.. Performance was stable from all sources.

3) JPL:
3.1) GSFC → JPL: Ratings: GSFC → JPL: Continued Excellent

Test Results: (additional results on next page)

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
NPP-SD3E-OPS1 → JPL-AIRS	764.3	436.7	230.3	95.8	463.9
GSFC-GES DISC → JPL-AIRS	435.2	387.2	278.7		
ESDIS-PTH → JPL-AIRS	606.0	368.1	235.7		
GSFC-NISN → JPL-AIRS	437.9	191.3	50.2		
NPP-SD3E-OPS1 → JPL-Sounder	783.8	434.1	253.8		
GSFC-NISN → JPL-Sounder	453.8	231.0	84.8		
ESDIS-PTH → JPL-MLS	478.0	418.9	243.5		
GSFC-NISN → JPL-MLS	499.0	355.1	158.4		

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
GSFC → JPL Combined	FY '14	**114.8**	**63**	**Excellent**
GSFC → JPL AIRS	FY '14	54.3	40	**Excellent**
GSFC → JPL OCO2	FY '14-	36.6	-	**Good**
GSFC NPP → JPL Sounder	FY '14-	15.9	15	**Excellent**
GSFC → JPL Other	FY '14-	7.9	1.0	**Excellent**

Comments:

3.1.1 AIRS , Overall:
http://ensight.eos.nasa.gov/Missions/aqua/JPL_AIRS.shtml

The requirements were switched in June '14 to use the updated requirements database, adding OCO2 requirements (SMAP requirements will be added in FY'15). In June '12 they were switched to use the requirements database, instead of Handbook v1.4.3 previously.

Most GSFC → JPL thruput tests improved somewhat this month. The median integrated thruput from **NPP-SD3E-OPS1** remains above 3 x the increased AIRS requirement, so the AIRS rating remains Excellent .

3.1.2 The JPL overall rating is also based on the **NPP-SD3E-OPS1** to JPL AIRS thruput, compared with the sum of all the GSFC to JPL requirements. The median thruput also remained above 3 x this increased requirement (now with a bit of margin), so the overall rating remains Excellent . The average user flow this month was consistent with the increased requirement, with some OCO2 pre-launch testing.

3.1.3 NPP to JPL Sounder:
http://ensight.eos.nasa.gov/Missions/NPP/JPL_SOUNDER.shtml

Performance from **NPP-SD3E-OPS1** and **GSFC-NISN** had large diurnal variation this month, but improved and was more stable.

3.1.4 MLS:
http://ensight.eos.nasa.gov/Missions/aura/JPL_MLS.shtml

Thruput from both **ESDIS-PTH** and **GSFC-NISN** were noisy but better and more stable this month. Both were way above the modest requirement, so the rating remains Excellent .
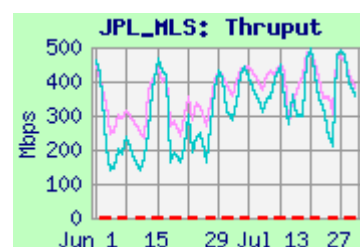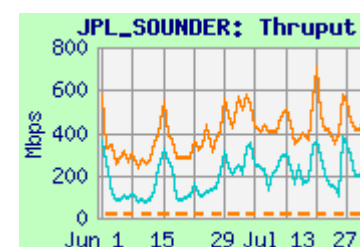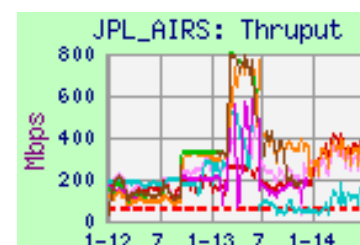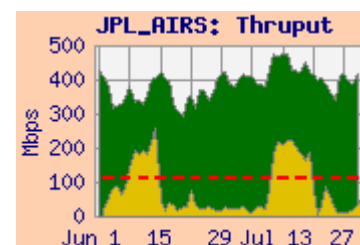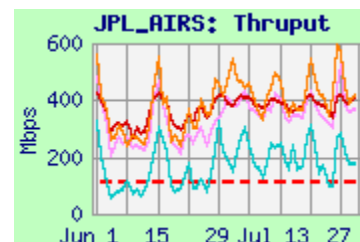
## 3.1) GSFC → JPL: continued

Test Results: continued

Source → Dest		Medians of daily tests (mbps)		
		Best	Median	Worst
ESDIS-PTH → JPL-PODAAC		168.4	112.2	57.2
GSFC-NISN → JPL- PODAAC		109.5	77.3	37.7
MODAPS-PDR → JPL-PODAAC		68.7	32.8	12.1
ESDIS-PS → JPL-QSCAT		92.9	92.5	86.9
GSFC-NISN → JPL-QSCAT		73.8	69.4	53.3
GSFC-EDOS → JPL-SMAP	1 stream	92.9	29.6	2.4
	6 streams	258.2	127.9	17.2
GSFC-EDOS → JPL-OCO2	1 stream	94.0	21.0	1.0
	6 streams	234.8	104.1	3.3

3.1.5 PODAAC:
http://ensight.eos.nasa.gov/Organizations/production/JPL_PODAAC.shtml

There is no longer a requirement from GSFC to JPL PODAAC in the database. Performance was a bit noisy but improved a bit; thruput was way above the previous 1.5 mbps PODAAC requirement.
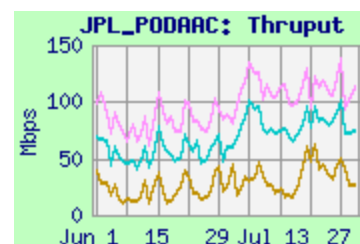
3.1.6 QSCAT:
http://ensight.eos.nasa.gov/Organizations/production/JPL_QSCAT.shtml

There is no longer a requirement from GSFC to JPL QSCAT in the database. Thruput from **ESDIS-PS** and **GSFC-NISN** to QSCAT was more stable, and remains well above the modest previous 0.6 mbps requirement.
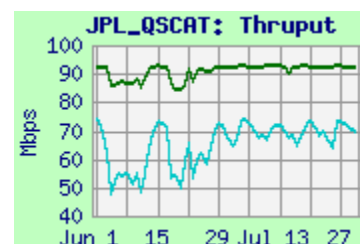
3.1.7 SMAP:
http://ensight.eos.nasa.gov/Organizations/daac/JPL_SMAP.shtml

There is no requirement from GSFC to JPL SMAP in the database [until FY '15]. Testing from EDOS to SMAP is done using both a **single stream** and **6 streams**. Performance was noisy but stable this month, similar to the performance from EDOS to many other sites. The SMAP server went down in early May – restored in June.
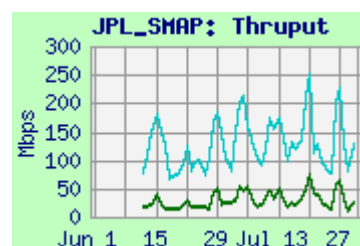
3.1.8 OCO2:
http://ensight.eos.nasa.gov/Organizations/daac/JPL_OCO2.shtml

The requirement from GSFC to JPL OCO2 began last month – OCO-2 was launched July 2! Testing from EDOS to OCO2 is done using both a **single stream** and **6 streams**. Testing began failing in early June, and was restored in mid-July. Thruput is noisy, and similar to EDOS to SMAP. Performance from EDOS (using 6 streams) is rated **Good** . Single stream performance would be rated **Low** .
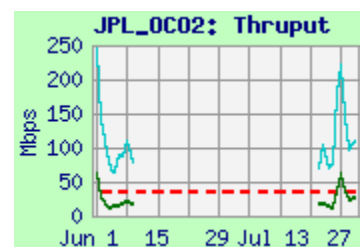
3.2) LaRC → JPL   Rating: ⬆ Good → Excellent

Web Pages:

http://ensight.eos.nasa.gov/Organizations/production/JPL_TES.shtml
http://ensight.eos.nasa.gov/Missions/terra/JPL_MISR.shtml
http://ensight.eos.nasa.gov/Organizations/production/JPL_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow
	Best	Median	Worst	
LaRC ASDC → JPL-TES	474.7	354.4	109.0	
LaRC ANGE → JPL-TES	419.4	331.2	217.9	
LaRC PTH → JPL-TES	177.2	159.6	105.0	
LaRC PTH → JPL-TES sftp	24.4	13.2	6.3	
LaRC ASDC → JPL-MISR	45.9	26.0	18.3	
LaRC PTH → JPL-MISR	36.0	18.0	13.5	1.3
LaRC ANGE → JPL-PTH	298.3	253.9	27.9	11.8
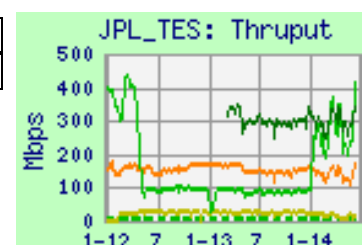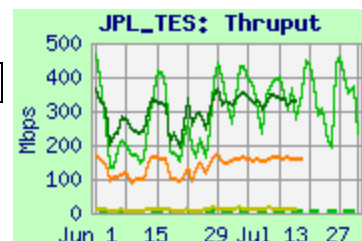
Requirements:

Source → Dest	Date	Mbps	Prev	Rating
LaRC → JPL-Combined	CY '12 –	83.5	69.3	Excellent
LaRC ASDC → JPL-MISR	CY '12 –	78.1	62.3	Low
LaRC ASDC → JPL-TES	CY '12 –	5.5	7.0	Excellent

3.2.1 LaRC→ JPL (Overall, TES): Performance from LaRC to JPL generally improved a bit and stabilized this month (as did GSFC to JPL). **LaRC ASDC** to JPL-TES had improved dramatically in early January with the ASDC node upgrade! It is now similar to (but noisier than) the thruput from **LaRC ANGe**, and that previously seen from **LaRC ASDC** until April 2012. The median thruput increased to be above 3 x the combined requirements, so the Overall rating improves to Excellent . Performance from **LaRC PTH** to JPL-TES is more stable, but is limited to 200 mbps by agreement with CSO / NISN.

Since the ASDC performance is now similar to that from LaRC ANGe (and better than from **LaRC PTH**), **testing from LaRC ANGe and LaRC PTH to JPL-TES has been discontinued.**

The median thruput remained well over 3 x the TES requirement, so the TES rating remains Excellent . User flow to TES is very low.

The LaRC to JPL integrated graph is not included this month, due to revised format of the flow data – the scripts had not been updated to incorporate the new version yet (They are working again as of early August). Instead, the graph on the right shows the user flow from LaRC to JPL for July. The average flow for July is 11.8 mbps).


LaRC to JPL Flow (mbps)
July 2014
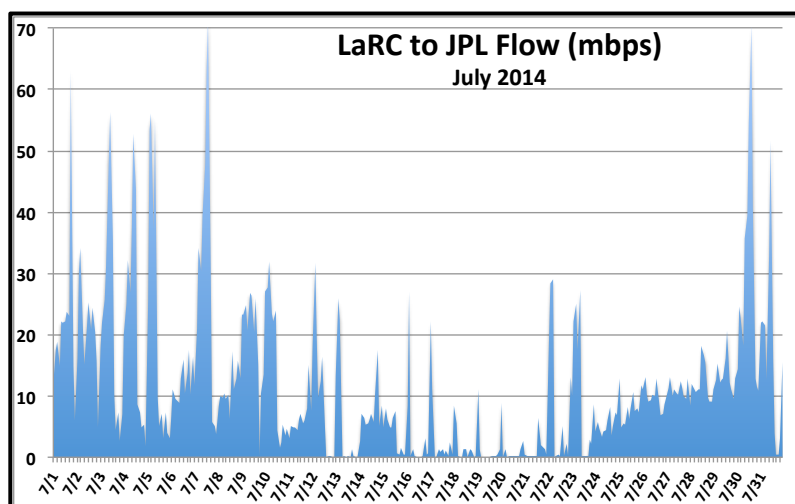
3.2) LaRC → JPL (continued)

3.2.2 LaRC → JPL-MISR: Testing from the upgraded **LaRC ASDC** node to JPL-MISR was unblocked in March; results from ASDC to MISR are similar to that from LaRC PTH. Thruput from LaRC to JPL MISR is limited by the Fast-E connection to the MISR node. Thruput to MISR from both sources dropped severely in March, after improving in December. The median integrated thruput from **LaRC ASDC** was right at 1/3 of the MISR requirement, so the MISR rating remains **Low**. User flow started strong (averaging about 5% of the requirement), but dropped off on July 9. (It had peaked at 13% in March-April). Note that the user flow peak occurred in February, BEFORE the measured thruput dropped in March, suggesting that the user flow is not the cause of the thruput drop.

The LaRC → JPL Overall rating is not based on this result, however, since it not indicative of the capability of the network.

Also note that due to the format change of the MRTG data from CSO / NISN, it is not clear that the graph below includes all relevant flows.

LaRC to JPL-MISR Flow (mbps)
July 2014
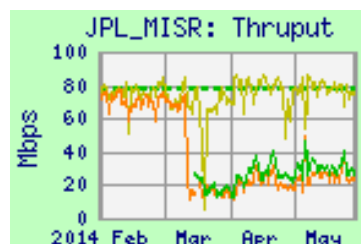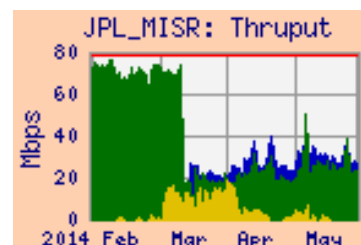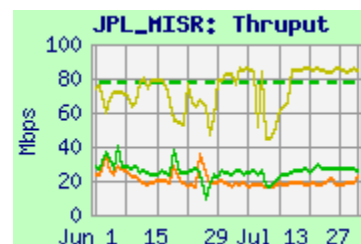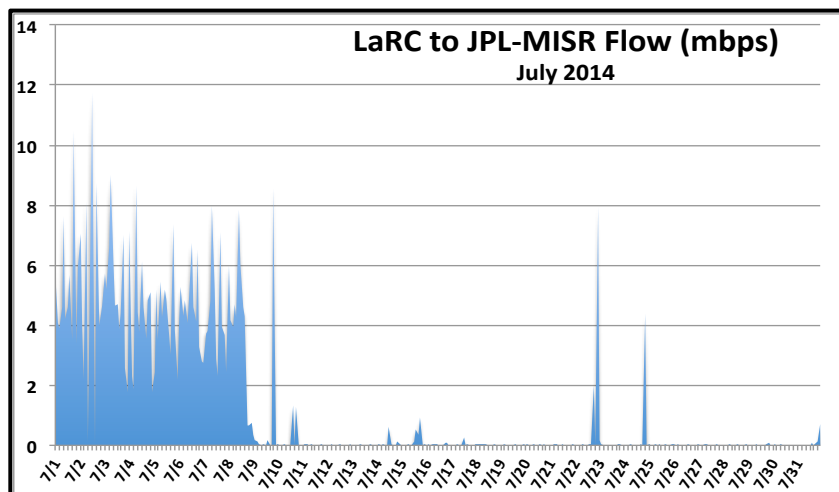
4) LaRC

4.1) JPL → LaRC   **Rating:** Continued **Excellent**

Web Page: http://ensight.eos.nasa.gov/Organizations/production/LARC_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			
	Best	**Median**	**Worst**	**User Flow**
JPL-PTH → LaRC PTH	240.0	168.9	104.0	0.5
JPL-TES → LaRC PTH	269.4	176.9	95.2	

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
JPL → LaRC	CY '12 –	1.1	1.5	**Excellent**
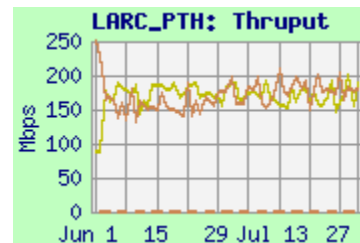
 Comment: This requirement is primarily for TES products produced at the TES SIPS at JPL, being returned to LaRC for archiving. The route from JPL to LaRC is via NISN PIP. This month the thruput from **JPL-TES** was less noisy and remained much higher than the requirement; the rating remains **Excellent** .

Thruput from **JPL-PTH** to LaRC-PTH increased at the beginning of June, when **JPL-PTH** was connected to a Gig-E port on a NISN switch – previously it was limited to 100 mbps due to its connection to a Fast-E port. The thruput is now similar to thruput from **JPL-TES**. Thruput from **JPL-PTH** had been stable at the higher of its two common states (88 mbps) since January 2013.

The JPL to LaRC integrated graph is not included this month, due to revised format of the flow data – the scripts have not been updated to incorporate the new version yet. Instead, the graph below shows the user flow from JPL to LaRC for July. The average flow for the period shown is 0.5 mbps). This is the entire flow from JPL to LaRC – it may not all be EOS related.
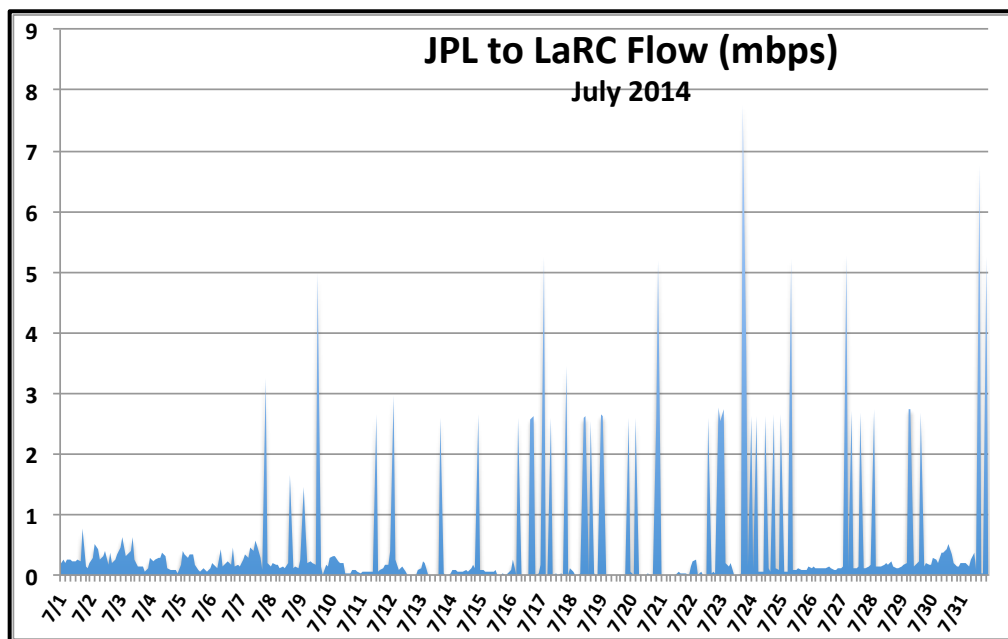
4.2) GSFC → LaRC:　　　　　　　　　**Rating:** Continued **Excellent**

Web Pages : http://ensight.eos.nasa.gov/Organizations/production/LARC.shtml
　　　　　　http://ensight.eos.nasa.gov/Organizations/production/LARC_ANGe.shtml
　　　　　　http://ensight.eos.nasa.gov/Organizations/production/LARC_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	**Median**	**Worst**		
GES DISC → LaRC ASDC	935.5	935.2	822.4	29.6	935.2
GSFC-EDOS → LaRC ASDC	927.7	840.1	116.5		
ESDIS-PTH → LaRC-ANGe	914.2	848.3	634.0		
GSFC-NISN → LaRC-ANGe	903.9	825.9	586.1		
GES DISC → LaRC-PTH	614.7	603.4	587.5		
GSFC-NISN → LaRC-PTH	620.1	605.4	588.5		
NPP-SD3E → LaRC-PTH	645.7	625.5	527.3		

Requirements:

| Source → Dest	Date	Mbps	Prev	Rating
GSFC → LARC (Combined)	CY '12 –	60.7	52.2	**Excellent**

Comments:

GSFC → LaRC ASDC: Thruput from **GES DISC** to LaRC ASDC DAAC remained well above 3 x the increased combined requirement, close to the circuit limitation, so the rating remains **Excellent** . Thruput to ASDC from **GSFC-EDOS** was slightly lower and noisier, but improved a bit in mid March along with other tests from EDOS.

As seen on the integrated graph, the 29mbps average user flow this month was close to typical and the requirement (without contingency).

GSFC → ANGe (LaTIS): Testing to ANGe ("Bob") from both **ESDIS-PTH** and **GSFC-NISN** was stable, close to the circuit limitation. (Note the expanded scale on the graph).

GSFC → LaRC-PTH: Testing to LaRC-PTH from **GES DISC**, **NPP-SD3E,** and **GSFC-NISN** was very stable, but below the performance to ASDC and ANGe. (Note the expanded scale on the graph).
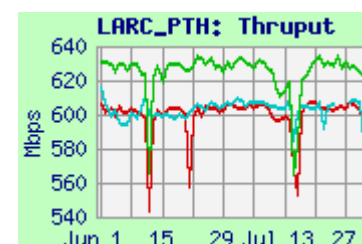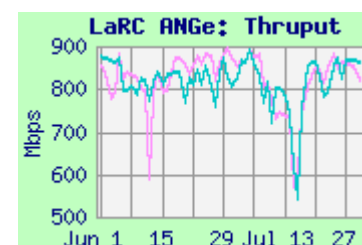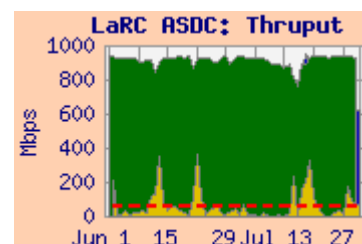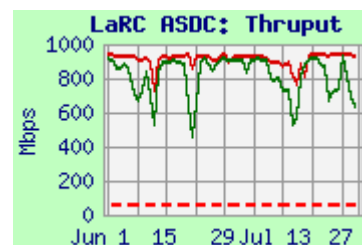
5) Boulder CO sites:
5.1) NSIDC:

Ratings: GSFC → NSIDC: Continued **Excellent**
GHRC → NSIDC: Continued **Excellent**
JPL → NSIDC: **N / A**

Web Pages: http://ensight.eos.nasa.gov/Organizations/production/NSIDC.shtml
http://ensight.eos.nasa.gov/Organizations/production/NSIDC_SIDADS.shtml
http://ensight.eos.nasa.gov/Organizations/production/NSIDC_PTH.shtml

Test Results: **NSIDC S4PA**

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
MODAPS-PDR → NSIDC DAAC	762.5	580.6	214.2	9.5	581.0
GES-DISC → NSIDC DAAC	821.5	792.4	477.3		
GSFC-EDOS → NSIDC DAAC	793.2	600.3	67.6		
ESDIS-PTH → NSIDC DAAC	869.0	813.4	496.4		
GSFC-ISIPS → NSIDC (iperf)	630.9	627.3	522.6		
JPL PODAAC → NSIDC DAAC	878.3	753.9	231.4		
GHRC → NSIDC DAAC (nuttcp)	39.4	8.5	2.2	1.15	
GHRC → NSIDC DAAC (ftp pull)	31.2	6.0	2.0		

Requirements:

| Source → Dest	Date	Mbps	Prev	Rating
GSFC → NSIDC	FY '14 –	1.06	8.42	Excellent
JPL → NSIDC	FY '14 –	-0-	0.16	N / A
GHRC → NSIDC	FY '14 –	2.08	0.46	Excellent

Comments: The requirements were updated last month to the FY '14 database. AMSR-E flows from EDOS and JPL have been removed, and MODIS reprocessing does not begin until August.

5.1.1 GSFC → NSIDC S4PA: The rating is based on testing from the **MODAPS-PDR** server to the NSIDC DAAC, since that is the primary flow. The median thruput from **MODAPS-PDR** remained well above 3 x the current requirement, so the rating remains **Excellent**. The 9.5 mbps average user flow was similar to last month, above the previous, higher requirement -- WITH contingency.

Testing from **GES-DISC**, **GSFC-EDOS,** and **GSFC-ISIPS** was also noisy but mostly stable. These tests previously used 15 streams to mitigate the small TCP windows on the NSIDC server. The sysadmin increased the window size at the end of June, with increased thruput – with fewer streams.


Testing from **ESDIS-PTH** previously got lower thruput, due to a higher RTT, based on a different return route from FRGP. Additional streams were added in June, to achieve thruput greater than 600 mbps (reduced at the end of June with retuning at NSIDC).

5.1.2 JPL PODAAC → NSIDC S4PA: The AMSR-E flow requirement was removed – there is no longer a JPL to NSIDC requirement (a new 17.1 mbps flow for SMAP will begin in FY '15).. Thruput from **JPL PODAAC** to NSIDC is well above the previous and future SMAP requirements. Thruput from JPL also improved with NSIDC increased window size.


16
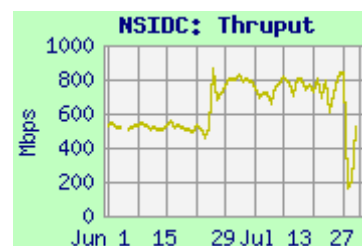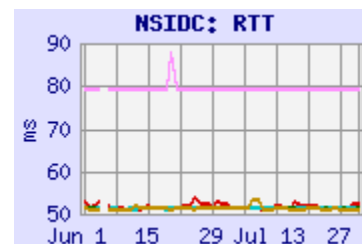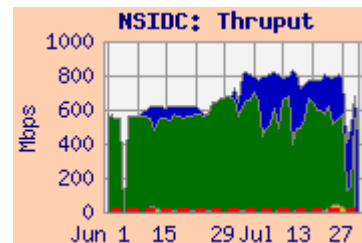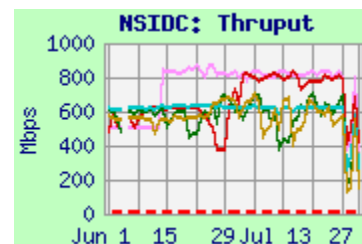
5) Boulder CO sites (Continued):

5.1.3   GHRC, GHRC-ftp → NSIDC S4PA: GHRC (NSSTC, UAH, Huntsville, AL) sends reprocessed AMSR-E data to NSIDC via Internet2. The median integrated thruput remained above 3 x the increased 2.08 mbps (previously 0.46 mbps) requirement, so the rating remains **Excellent** . This requirement increases to 5.14 mbps in September when L2A reprocessing begins.
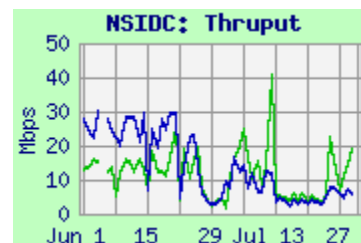

Test Results: NSIDC-SIDADS, NSIDC-PTH

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
GSFC-ENPL → NSIDC-SIDADS	618.0	592.5	462.0
GSFC-NISN → NSIDC-SIDADS	122.1	121.5	100.4
ESDIS-PTH → NSIDC-PTH	400.8	348.2	249.1
MODAPS-PDR → NSIDC-PTH	197.7	153.7	132.9
JPL-PTH → NSIDC-PTH	243.6	161.8	94.5
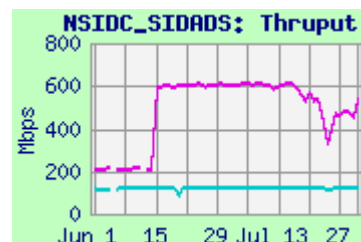
5.1.4 GSFC → NSIDC-SIDADS: Performance from GSFC-NISN to NSIDC-SIDADS was very stable. Performance from GSFC-ENPL was retuned in June with increased thruput.

5.1.5 NSIDC-PTH: Thruput from GSFC sources to NSIDC-PTH was stable. JPL-PTH was limited by its Fast-E connection until it was upgraded and testing retuned in June.
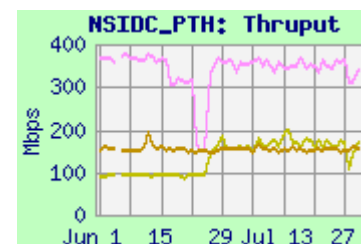
5.2) LASP: Ratings: LASP → GSFC: Continued **Excellent**

Web Page: http://ensight.eos.nasa.gov/Organizations/production/LASP.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
ESDIS-PTH → LASP blue (scp)	3.80	3.75	3.41
ESDIS-PTH → LASP blue (iperf)	9.36	9.33	8.40
GES DISC → LASP blue (iperf)	7.92	7.80	6.78
LASP → GES DISC	9.12	8.68	8.14

Requirement:

Source → Dest	Date	Mbps	Rating
LASP → GES DISC	CY '10 -	0.016	**Excellent**

Comments: In January '11, LASP's connection to NISN PIP was rerouted to a 10 mbps connection to the NISN POP in Denver; previously it was 100 mbps from CU-ITS via NSIDC.

Iperf testing from **GES DISC** has been very stable since February 2013, when it improved with the GES DISC firewall upgrade. Iperf and **SCP** testing from **ESDIS-PTH** was also very stable, and consistent with the circuit limitation, as was return testing from **LASP** to GES DISC, rating **Excellent** .

5.3) UCB: http://ensight.eos.nasa.gov/Organizations/daac/UCB.shtml
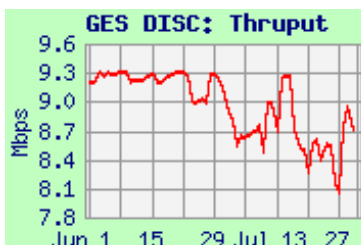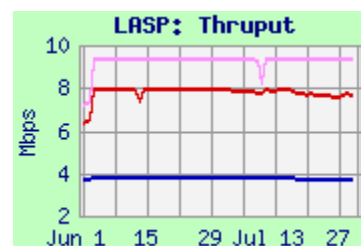
Test Results:

Source	Medians of daily tests (mbps)		
	Best	**Median**	**Worst**
GSFC-ENPL	730.5	675.2	598.9
GSFC-ESTO	904.1	888.9	755.2

UCB: Thruput

Comments: Testing to the 10 gig connected test node at UCB began failing consistently in mid-May 2013, so testing was switched to a 1 gig test node in mid-June '13. The route is via Internet2 to FRGP, similar to NCAR. Thruput from both **GSFC-ENPL** and **GSFC-ESTO** was stable (except for the end of July, when all tests to Boulder performed poorly – corrected in August).
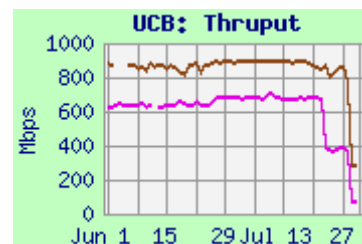
5.4) NCAR:

Ratings: LaRC → NCAR: Continued **Excellent**
GSFC → NCAR: Continued **Excellent**

Web Pages   http://ensight.eos.nasa.gov/Missions/terra/NCAR.shtml

Test Results:

Source	Medians of daily tests (mbps)		
	Best	**Median**	**Worst**
LaRC PTH	175.0	145.1	111.8
GSFC-ENPL-10G	3785.5	2296.7	1144.2
GSFC-ENPL-FE	94.6	94.4	94.0
GSFC-NISN	861.2	763.7	358.4

NCAR: Thruput

Requirement:

| Source	Date	Mbps	Prev	Rating
LaRC	CY '12 -	0.044	0.1	**Excellent**
GSFC	CY '12 -	0.111	5.0	**Excellent**

Comments: NCAR has a SIPS for MOPITT (Terra, from LaRC), and has MOPITT and HIRDLS (Aura, from GSFC) QA requirements.

Testing was switched to NCAR's 10 gigabit capable PerfSonar server in March '12 – testing was discontinued from **LaRC ASDC** at that time; testing from **LaRC-PTH** continued.

NCAR: Thruput

 From LaRC: Thruput from **LaRC-PTH** was stable. The median remained well above 3 x the tiny requirement, so the rating remains **Excellent** . Note that outflow from **LaRC-PTH** is limited to 200 mbps by agreement with CSO / NISN.

 From GSFC: From **GSFC-NISN**, the route is via NISN to the MAX (similar route as from **LaRC-PTH**). Thruput was mostly stable this month. The median was well above 3 x the tiny requirement, so the rating remains **Excellent** . **There was a peak user flow from GSFC-EBnet – about 200 mbps -- in April and May, and smaller 30 mbps peaks in June and July, averaging 5.8 mbps in July** (averaged 2.3 mbps in June) This was waaaay above the revised requirement, and the previous requirement as well.

NCAR: Thruput

From **GSFC-ENPL-10G**, with a 10 Gig-E interface, and a 10 gig connection to MAX, performance to NCAR's 10 Gig PerfSonar node is also noisy, but gets almost 4 gbps on peaks.
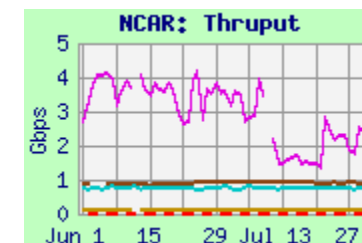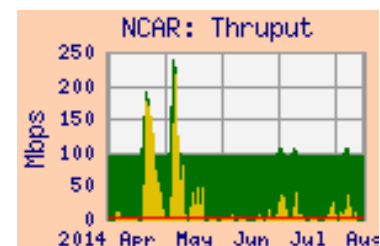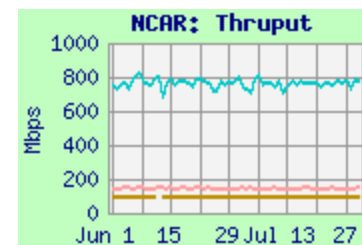
6) Remote Sensing Systems (RSS):

Ratings: **JPL → RSS:** N/A
RSS → GHRC: N/A

Web Page   http://ensight.eos.nasa.gov/Missions/aqua/RSS.shtml

Comments: RSS (Santa Rosa, CA) is a SIPS for AMSR-E (Aqua), receiving L1 data from JAXA via JPL, and sending its processed L2 results to GHRC (aka NSSTC) (UAH, Huntsville, AL). Note that AMSR-E has not been operating since November, 2011, so that this data is not flowing. Thus there are no longer any EOS requirements for flows to or from RSS.

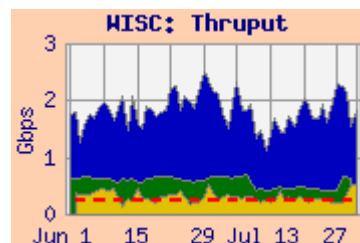## 7) Wisconsin:

Rating: Continued **Excellent**

Web Pages   http://ensight.eos.nasa.gov/Missions/NPP/WISC.shtml

Test Results:

Source Node	Medians of daily tests (mbps)			User Flow	Integrated
	Best	**Median**	**Worst**		
NPP-SD3E	2326.7	1777.4	1002.8	252.9	1813.6
GES DISC	462.1	416.2	396.0		
GSFC ENPL	5384.6	2155.3	622.2		
LaRC ANGe	465.8	355.6	132.6		
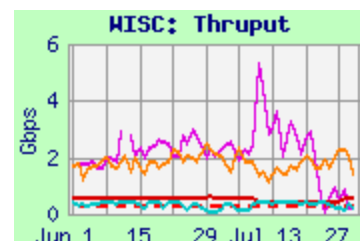
Requirements:

Source Node	Date	mbps	Prev	Rating
NPP-SD3E	FY'14 -	242.3	237.2	**Excellent**
GSFC MODAPS	FY'14 -	21.9	16.5	**Excellent**
GSFC Combined	FY'14 -	264.2	253.7	**Excellent**
LaRC Combined	CY'12 -	n/a	7.9	**n/a**

Comments: The University of Wisconsin is included in this Production report due to its function as Atmosphere PEATE for NPP. Wisconsin continues to be an SCF on the MODIS, CERES and AIRS teams**.**

GSFC: At the end of March 2013, testing from **GSFC-ENPL** was switched to a new 10 gig server at Wisconsin (SSEC), with thruput now typically 2 - 4 gbps.

User flow was above, but close to the requirement, similar to last month.

Testing from **NPP-SD3E** was also switched to Wisconsin's 10 gig server in May 2013, with thruput now usually close to 2 gbps! The integrated thruput from **NPP-SD3E** remained above the NPP requirement by 3 x, so the NPP rating remains **Excellent** . It was also above the GSFC combined requirement by more than 3 x, so the combined rating also remains **Excellent** .

The route from EBnet at GSFC is via MAX to Internet2, peering with MREN in Chicago.

LaRC: There is no longer a CERES requirement from LaRC to Wisconsin. In April 2013, testing from **LaRC ANGe** was switched to the new SSEC 10 gig server; performance improved at that time. Thruput from **LaRC ANGe** remains well above the previous 7.9 mbps requirement; it would be rated **Excellent** . The route from LaRC is via NISN, peering with MREN in Chicago.

8) KNMI: Rating: Continued **Excellent**

Web Pages http://ensight.eos.nasa.gov/Missions/aura/KNMI_ODPS.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
OMISIPS → KNMI-ODPS	122.6	79.4	60.8	1.77	79.8
GSFC-ENPL → KNMI-ODPS	500.0	107.5	59.2		

Requirements:

Source Node	Date	mbps	Prev	Rating
OMISIPS	CY'12 -	13.4	0.03	**Excellent**

Comments: KNMI (DeBilt, Netherlands) is a SIPS and QA site for OMI (Aura). The route from GSFC is via MAX to Internet2, peering in DC with Géant's 2+ x 10 gbps circuit to Frankfurt, then via Surfnet through Amsterdam.

The requirement was increased with the use of the database to 13.4 mbps, a much more realistic value than the previous 0.03 mbps.

The rating is based on the results from **OMISIPS** on EBnet at GSFC to the ODPS primary server at KNMI. Thruput from both sources was stable until near the end of April, when it dropped significantly, due to increased packet loss. But the median thruput remains well above 3 x the increased requirement, so the rating remains **Excellent** .

The user flow, however, averaged only 1.77 mbps this month, similar to recent months, but only 13% of the revised requirement.
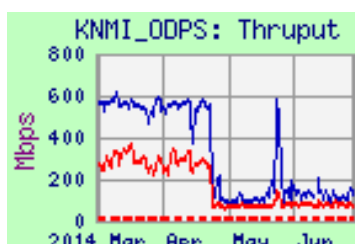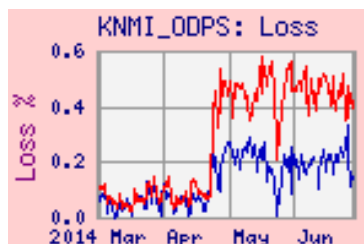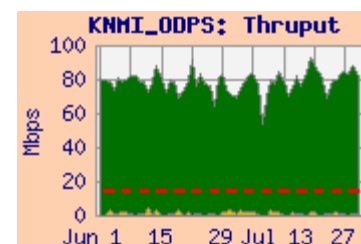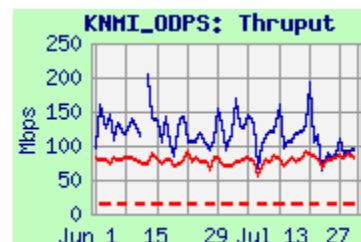
9) JSpace - ERSD:

Ratings: **GSFC → ERSD:** Continued **Excellent**
ERSD → EROS: Continued **Excellent**
ERSD → JPL-ASTER-IST: N/A

Web Page: http://ensight.eos.nasa.gov/Organizations/production/ERSDAC.shtml

US ←→ JSpace - ERSD Test Results

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GSFC-EDOS → JSpace-ERSD	214.7	48.1	7.4	4.32	50.5
GES DISC → JSpace-ERSD	92.5	42.9	20.5		
GSFC ENPL (FE) → JSpace-ERSD	84.4	80.0	62.7		
GSFC ENPL (GE) → JSpace-ERSD	474.0	84.5	44.3		
JSpace-ERSD → EROS	311.6	298.5	212.8	5.63	298.5
JSpace-ERSD → JPL-TES	155.8	98.9	37.7		

Requirements:

Source → Dest	CY	Mbps	Prev	Rating
GSFC → JSpace-ERSD	'14 -	16.4	6.75	**Excellent**
JSpace-ERSD → JPL-ASTER IST	'12 -	0.31	0.31	**Excellent**
JSpace-ERSD → EROS	'12 -	8.33	8.3	**Excellent**

Comments: **GSFC → JSpace-ERSD:** The median thruput to JSpace-ERSD from most sources improved in September 2011, when the connection from JSpace-ERSD to Tokyo-XP was upgraded to 1 gbps (from 100 mbps). Peak thruput from **GSFC ENPL** is now often over 400 mbps.

Performance from all sources became very noisy and starting in mid-May. The JSpace POC reports that they are ingesting large amounts of PALSAR data, affecting performance. Median integrated thruput from **GSFC-EDOS** remained [slightly] above 3 x the increased requirement, so the rating remains **Excellent** . The user flow was close to normal from GSFC to JSpace-ERSD this month, below the increased requirement.

JSpace-ERSD → JPL-ASTER-IST: The JPL-ASTER-IST test node was retired in October 2012. JPL no longer uses a distinct IST; instead, JPL personnel log in directly to the IST at JSpace-ERSD. As a substitute, testing was initiated from ERSD to a different node at JPL ("TES"). Results to TES were noisy but mostly stable, and would be rated **Excellent .**

JSpace-ERSD → EROS: Thruput remains well above the reduced requirement (was 26.8 mbps previously), so the rating remains **Excellent** . The user flow this month was consistent with the requirement, without contingency.
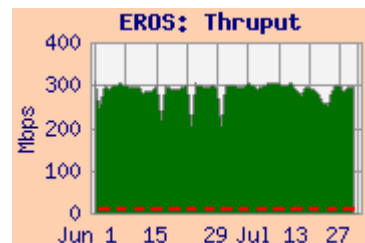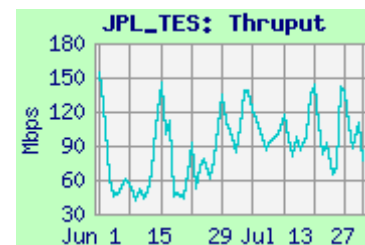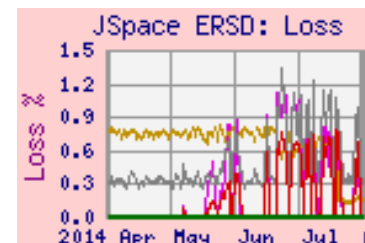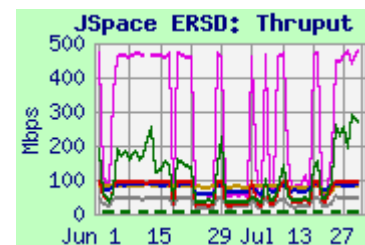
10) GSFC ← → JAXA

Ratings: GSFC → JAXA: N/A
JAXA → GSFC: N/A

The JAXA test hosts at EOC Hatoyama were retired on March 31, 2009. No additional testing is planned for AMSR, TRMM, or GPM. All testing to JAXA-TKSC for ALOS was terminated at the end of June '09. JAXA has been requested to restore these tests – primarily testing different protocols for GPM -- but testing has not yet been initiated.

However, the user flow between GSFC-EBnet and JAXA continues to be measured. As shown below, the user flow this month averaged 10.9 mbps from GSFC-EBnet to JAXA, and 2.2 mbps from JAXA to GSFC-EBnet.

These values are consistent with the new database requirements of 15.4 mbps from GSFC to JAXA, and 3.3 mbps from JAXA back to GSFC (The AMSR-E requirement from JAXA to JPL has been removed, due to AMSR-E failure). However, since no iperf tests are run, the true capability of the network cannot be determined, and therefore no rating is assigned.
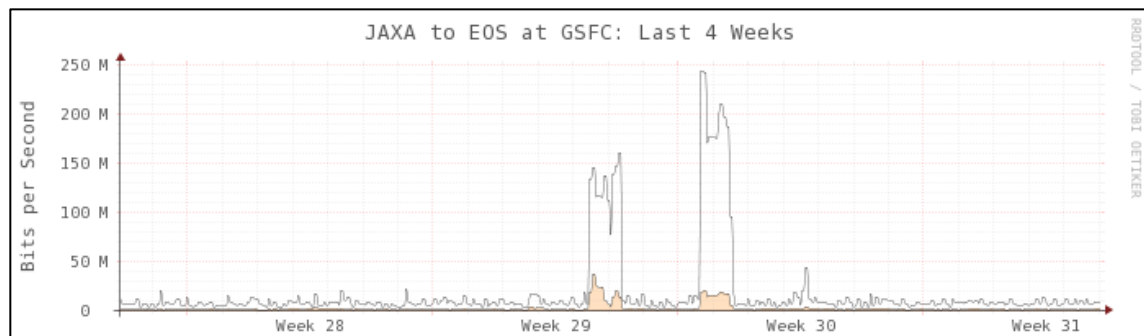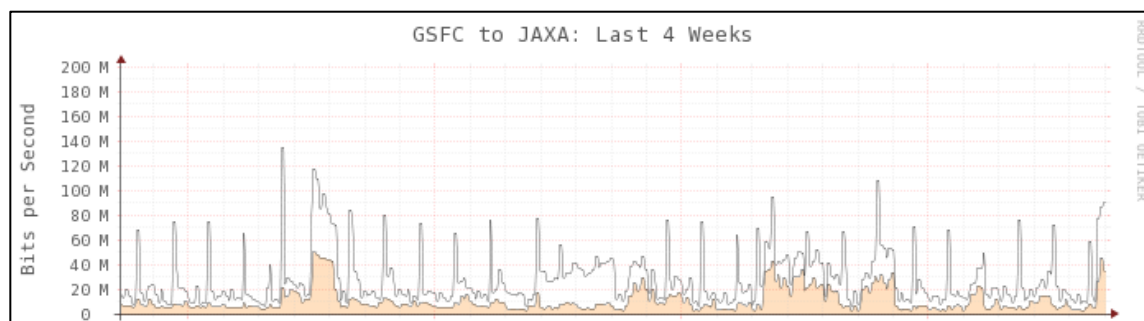
For comparison, testing is performed from GSFC to a test node at the Tokyo Exchange point, which is on the route from GSFC to JAXA. Performance to the Tokyo-XP 10 gig server, is well in excess of the JAXA requirements..